CSIR NEWS

A FORTNIGHTLY HOUSE BULLETIN OF CSIR

VOL. 27 15 DECEMBER 1977 NO. 23

Report on Coastal Erosion at Thumba : NIO

At the request of the Thumba Equatorial Rocket Launching Station (TERLS) of the Vikram Sarabhai Space Centre, Trivandrum, the National Institute of Oceanography, Goa, carried out a detailed study on the coastal environmental conditions with reference to beach erosion at Thumba from April 1976 to July 1977 [*CSIR News*, **26** (1976), 190].

The final report has now been prepared and highlights : (i) seasonal observations of the coastal environmental factors causing changes in the beach profile; (ii) analysis of the data with a view to identifying the dominant factors causing beach erosion at Thumba; and (iii) design of suitable remedial measures to protect the coastal installations.

The erosion of the Thumba beach is mainly due to the attack of steeper waves possessing high energy during the southwest monsoon season when the transport of the beach material would be predominantly in the offshore direction. During the non-monsoon season, the less steeper swell waves would help the beach to recover most of the lost material as they induce movement of the sediment in the onshore direction. In addition to the onshore/offshore movements, a considerable amount of beach material was also observed to move in the alongshore direction.

Taking into consideration the various problems associated with the coastal protective structures and probable side effects, the most suitable remedial measures were evolved and recommended. As the control centre of TERLS is the most valuable property and is located close to the waterfront, a permanent type of protective structure requiring a minimum of maintenance cost has been suggested. This consists of a prestressed concrete sheet pile seawall of about 100 m long, the seaward side of which is protected by rock and armour blocks placed along a slope of 2 horizontal to 1 vertical. The seaward side of the toe wall is also provided with a suitable rock protection.

For protecting the static test facility and launching pads, a less expensive and a more flexible type of protective measure has been suggested which makes use of the locally available timber or coconut piles and stones.

Cyanide Distillation Apparatus

The National Environmental Engineering Research Institute (NEERI), Nagpur, has fabricated a cyanide distillation apparatus which is cheaper and compares favourably in performance with the imported Fisher Milligan unit. The NEERI gas absorber is now routinely used along with the cyanide distillation apparatus for the estimation of cyanides in water samples.

Saltless Curing using Compounds of Neem Oil : CLRI

The Central Leather Research Institute (CLRI), Madras, has developed a new method of curing raw hides and skins with a mixture of organic compounds obtained from neem oil. This method dispenses with the use of common salt which forms a major pollutant in tannery effluents. The use of these compounds has been found to be satisfactory, as shown by the comparative tanning experiments using wet-salted skins and skins treated with the compounds. The other advantages of the new method are : (i) there is no deterioration in quality of skins during storage; (ii) soaking back is easy as there is no need to resort to the use of wetting agents and bactericides; and (iii) transportation cost is reduced and the quality of final leather is comparable with that of leathers obtained from wet-salted stock.

Solvent Fatliquoring System

A solvent fatliquor blend has been formulated at CLRI, using entirely indigenous fatliquors and a cheap and commercially available solvent. The main advantages of the blend are : (i) the leathers produced are lighter and softer and the softness is obtained with a lesser amount of fatliquor (saving of 30-40% fat); (ii) the penetration is satisfactory and the feel obtained is similar to the one obtained generally with mineral oils; and (iii) tanners can easily prepare this blend in their own tannery from indigenous fatliquors which are being used at present.

Leather Finishing Agent

A new leather finishing agent based on chlorinated rubber has been developed at CLRI. The development of this product is based on a systematic application of some novel research approaches, viz. grafting of acrylic polymers on to chlorinated rubber. The advantages claimed for this new product are its high flexural endurance, wet and dry rub fastness and good gloss. The

product can be used as a good substitute for nitrocellulose lacquer which is not available in sufficient quantity for the leather finishing industry. The product was worked out under a project sponsored by a private firm.

Visvesvaraya Day at VITM

To commemorate the 117th birth anniversary of Dr M. Visvesvaraya, the Visvesvaraya Industrial & Technological Museum (VITM), Bangalore, organized an exhibition on cinematography from 15 September to 15 October 1977. The exhibition, first of its kind in the country, traced the scientific and technological growth of the hardware of cinema. The exhibition had the following sections : (i) period prior to moving picture period, (ii) moving picture period, (iii) the science and technology of contemporary cinema, and (iv) certain scientific and technological aspects of future cinema such as drive-in cinema and cinerama.

A first-day cover brought out by the museum with a special cancellation made by the P&T Department was released on this occasion. Prizes were distributed to the student winners of science quiz and science seminar organized during the celebrations.

VITM also conducted a film workshop for selected college students on the various techniques of short film making and another film workshop for the scientists, lecturers and officers from banks and factories on the making of science films.

Deputation Briefs

Shri V. K. Mathur of the Central Building Research Institute (CBRI), Roorkee, visited Thailand and Bangladesh, on the invitation of Unesco, from 2 to 21 October 1977. The purpose of the visit was to exchange information on respective programmes of research, to discuss building design implications of new 10+2+3 curriculum, and to get acquainted with the primary school programmes undertaken by various agencies in Bangladesh. Shri Mathur had discussions with the principal architect and cost expert of the Regional Office for Education in Asia, Unesco, Bangkok, on current research projects on educational buildings being done by CBRI and also on the space requirements and design of new school buildings to be commensurate with 10+2 curriculum.

Shri Mathur also visited the Building Division of Thai Scientific and Industrial Research Organisation, Bangkok, and the faculty of Architecture, Silpakorn University. He had discussions on projects of school buildings with the director and scientists of the Building Division who showed keen interest in the work being done at CBRI. Two scientists from Thailand will be visiting CBRI to study the projects on school buildings.

In Bangladesh, Shri Mathur had discussions on respective building construction programmes with the engineer advisor and other officials of Bangladesh Government. It was observed that the approach suggested by CBRI for construction of primary schools, simultaneously in large numbers, in India may also be tried in Bangladesh. The discussions were followed by visits to jute-reinforced plastic schools and other school buildings in Dacca and Chittagong. It was observed that the scientific study on the possibility of producing a resin within the country needs serious attention as it might drastically reduce the cost of construction.

Shri Mathur also visited the Housing and Building Research Institute in Dacca.

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Shri B. K. Handa of the National Environmental Engineering Research Institute (NEERI), Nagpur, attended, on deputation, the conference on 'Sanitation in Developing Countries Today', held under the aegis of OXFAM and in collaboration with the Ross Institute of Tropical Hygiene, Oxford, from 5 to 9 July 1977. The object of the conference, at which 33 research papers were read, was to collect information and recommend methods for collection, treatment and disposal of excrement material from rural, semi-urban and urban population. Shri Handa was the chairman of a group session. In his paper he highlighted the salient features of NEERI's rural sanitation programme, i.e. provision of individual sanitary latrines in villages, disinfection of well water, mass wormicidal treatment, and the pattern of prevalence of worm load in the rural set-up based on the collected baseline health data. Shri Handa also presented a paper on behalf of Dr B. B. Sundaresan, Director of NEERI, on 'Low-cost waste treatment and utilization system'. During discussions on this paper, the delegates stressed that the data contained in the paper would be useful in the future design of waste treatment and utilization schemes in the tropical countries.

Shri Handa also attended the International Technical Advisory Group (TAG) meeting on 'Disposal of Human Excreta in Rural Areas in Ghana', organized by the Environmental Quality Engineering Division of the University of Science & Technology, Kumasi, Ghana, from 11 to 15 July 1977. The object of the meeting was to study and discuss the various types of latrines being used in the rural areas all over the world with a view to ranking them and selecting suitable systems for further development and/or field studies. Twenty-five latrine types were identified and analyzed for different attributes with rating of attributes. The rural latrine of NEERI's design secured maximum points and was followed by dug well latrine, offset dry pit latrine (Tanzanian experience) and offset compost pit latrines. However, it was decided that in villages where adequate water is available NEERI-designed hand-flushed water-seal latrine should be taken up, whereas in the absence of adequate water supply, offset dry pit latrine and offset compost pit latrines should be tried.

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Dr V. Chalapathi Rao of the National Environmental Engineering Research Institute (NEERI), Nagpur, completed a one-year assignment as Visiting Scientist to the Food &

Drug Administration (FDA), US Government; he came back to NEERI on 31 October 1977. During his assignment, he developed a sensitive method for the isolation and recovery of viruses from shellfish. The method has been accepted by FDA and it proposes to submit the method for collaborative study to several American universities which are engaged in food virology work. Using this technique, it is possible to process 100 g of shellfish tissues and effect virus removal to the extent of 70%.

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Dr M. M. Dhar of the Central Drug Research Institute (CDRI), Lucknow, visited USA from 7 to 26 October 1977 in connection with the collaborative programme on the development of new therapeutic agents against cancer, being conducted by CDRI and the National Cancer Institute of the National Institutes of Health, USA.

The first phase of the visit was to the WARF Institute, Madison (Wisconsin), where the materials from CDRI were subjected to anticancer tests. The major part of Dr Dhar's visit was spent in the Washington area in Silver Spring, Bethesda, where the National Cancer Institute is located. Seminars and discussions provided indications of the new trends in cancer research. It was gratifying to note that the CDRI programme had anticipated some of these, particularly in the areas of synthetic peptides and new drug delivery systems.

Dr Dhar also visited the Steven's Institute of Technology, Hoboken, New Jersey. This institute has acquired reputation for the new uses it has found for sophisticated tools in biomedical research. Its current use of chemical ionization mass spectrometry and negative ion mass spectrometry is providing leads that could become routine diagnostic procedures in a number of disease conditions such as coronary heart disease, hepatitis and cancer.

PROGRESS REPORTS

NCL Annual Report: 1976-77

The annual report of the National Chemical Laboratory (NCL), Poona, for 1976-77, published recently, shows that the laboratory's thrust was on : (i) increasing agricultural productivity and economic utilization of forest and plant resources; (ii) utilization of regenerative resources like cellulosic materials; (iii) utilization of mineral resources; (iv) rural and backward area development; (v) R & D work in critical sectors such as health care (drugs and pharmaceuticals), defence, petrochemicals, polymers and elastomers; (vi) absorption of technology; and (vii) contribution to frontiers of science and technology such as plant tissue culture, development and use of immobilized enzymes as industrial catalysts, use of solar energy and technologies for export.

A total number of 124 research projects was investigated in 20 areas. Of these, 83 were productoriented. Against an expenditure of Rs 17.68 million the total receipts of the laboratory were Rs 1.5 million. The value of production on account of 71 processes in production was Rs 156.2 million. The estimated savings in foreign exchange as a result of this production is about Rs 62.3 million.

Six processes were released during the year. Production was reported, for the first time, on seven processes based on NCL know-how, viz. carbazole, dioxazine violet pigment, dimethylaniline (continuous process), *p*-menthane hydroperoxide, phenylacetic acid, potentiometric strip chart recorder, terpineol, and oxalic acid from bark of Ain tree.

Four sponsored projects concluded during the year, and these related to : anisidines by liquid phase hydrogenation of nitroanisoles; flavonoids, tannins, stilbenes, lignans and quinones in some Indian forest trees; molybdenum chemicals from molybdenum concentrate; and sorbitol from glucose by continuous process.

A modified zeolite catalyst was developed for catalytic disproportionation of toluene. It enables continuous vapour phase heterogeneous reaction.

Process know-how for the following pesticides and agrochemicals was developed and made ready for release: (1) Carboxin, a modern fungicide which is selective against pathogen without causing injury to hosts. It is not manufactured in India at present and its requirement by 1978-79 is estimated to be 50 tonnes/annum, valued at Rs 10.9 million; (2) Dimethoate, an excellent organophosphorus pesticide widely used in India to control a wide range of insects. Present requirement of dimethoate (technical grade) is 850 tonnes/annum, valued at Rs 62 million; (3) Fenitrothion, a contact insecticide and selective acaricide used for controlling chewing and sucking insects on rice, orchard fruits, vegetables, cereals and cotton; and (4) Ethephon, used in rubber plantations as a plant growth regulator.

A three-step process for preparation of hexachlorocyclopentadiene (HCCP) starting from dicyclopentadiene was established on a bench scale. HCCP is mainly required in the manufacture of pesticides, such as endosulfan, chlordane and heptachlor.

A process was worked out on a scale of 0.5 kg/day for butenediol, an important intermediate for endosulfan, vitamin B_6, plasticizers, resins, butadiene diepoxide and polyurethane structural laminates with high flexural strength and modulus. It is not produced in the country and the demand is estimated at 2000 tonnes/annum, valued at about Rs 60 million.

A new slow-release, selective, preemergent herbicide formulation for the control of parthenium was developed. About 1.5 tonnes of the material were produced on a pilot plant for multilocational field evaluation.

A process for the preparation of 3,4-dichloroaniline was developed. It is an important intermediate required in the manufacture of dyestuffs and the pesticides propanil and diuron,

and its present requirement is about 850 tonnes/annum.

A pilot plant for production of trichlorobenzene from non-γ BHC on 100 kg/batch scale was designed. The pilot plant batches gave consistent results. The resultant product was found to contain about 90% of 1,2,4- and 10% of 1,2,3-trichlorobenzene.

A complete project report on the production of dicyandiamide (DCD) from calcium cyanamide (nitrolim) by NCL improved process was submitted to the Ordnance Factory, Bhandara. Work was in progress to standardize a continuous process for the production of DCD.

Developmental work on the metal and cermet (metal/metal oxide) film resistors was carried out on small batches of 50-80 per run for 0·5 W ceramic substrate yielded resistors with basic value ranging from 30 to 500 ohm in the case of metal film resistors and 100 to 1500 ohm in the case of cermet films. These film resistors had TCR value between 50 and 200 ppm/°C for the Ni-free and Ni alloys and below 100 ppm/°C for cermet films. Load, humidity and pulse tests were carried out and samples found to vary by 0.1% in both metal and cermet film resistors. The above resistors can be prepared from indigenously available raw materials.

Work on the application of tissue culture technique for multiplication of forest trees like teak and eucalyptus, and spices like turmeric and cardamom was continued. Plantlet regeneration was obtained from teak and eucalyptus seedlings, from turmeric rhizomes and from interspecific hybrid papaya immature embryos. Field trials were in progress with the papaya and turmeric plantlets.

Nitrite reductase from *Achromobacter fischeri* was obtained in pure form and characterized. The enzyme is unique in that six-electron reduction of nitrite to ammonia is carried out by a single enzyme. The subunit structure and the kinetics of unfolding and refolding of the enzyme were studied.

Work on papain inhibitors of *Vigna catjang* was completed. Three of the papain isoinhibitors were obtained in highly purified form and their properties and kinetics were studied. They were specific for papain, chymopapain and ficin, and had no action on other proteolytic enzymes.

Considerable progress was made in the Chandrapur development project. NCL scientists in collaboration with the Maharashtra Government authorities prepared a working paper on the basis of the recommendations contained in the task force reports on forests, agriculture, animal husbandry, small and large scale industries and infrastructure schemes.

Seventy-one research papers were published and six patents were filed during the year.

CIMPO Annual Report 1975-76

The Central Indian Medicinal Plants Organisation (CIMPO), Lucknow, has brought out its annual report for 1975-76. It shows that the laboratory gave top priority to the development of technology for the cultivation of sapogenin-bearing species of *Dioscorea*, because of the acute shortage of this raw material in the country. The regional centre in Jammu & Kashmir took up projects pertaining to the development of agrotechnology and processing technology in order to increase the yield of medicinal and aromatic plants. In all, 43 R & D projects were taken up during the year at the headquarters and the regional centres.

Dioscorea floribunda was introduced in the north Indian plains. Tubers of this plant are an important source of diosgenin used for the synthesis of cortisones, sex hormones and oral contraceptives. A clone with a high diosegenin content has been selected from the seeds introduced from Puerto Rico. This clone is being multiplied for testing at various centres of CIMPO.

From pilot scale trials, it was observed that the tarai region of Uttar Pradesh is suitable for commercial production of pharmaceutical grade ergot. The technology has now been passed on to the commercial unit of the farm for starting commercial production during the next year. *Triticale* has been found to be a new host for *Claviceps purpurea* for the production of excellent grade ergot. The alkaloid content of the ergot produced on *Triticale* has been found to be 50% higher than that of ergot produced on rye. At the Haldwani Regional Centre it has been observed that rock phosphate is a superior fertilizer compared to superphosphate for application to Japanese mint.

For the first time, it has been found that application of fertilizers to pyrethrum gives considerable increase in the yield of the flowers in the Kashmir Valley. The fertilizer schedule has also been worked out for rye and belladonna both in Jammu and Kashmir. One significant achievement of the J & K Regional Centre has been the development of complete agrotechnology for commercial cultivation of *Dioscorea deltoidea*, which is one of the most important raw materials for the production of diosgenin. The technology has been released to the commercial unit of the farm. The centre has also introduced hops (*Humulus lupulus*), from USA and has developed indigenous technology for the cultivation of this valuable crop in the Kashmir Valley. A commercial plantation of one hectare has already been established. It will serve as a model for private growers in the valley. An improved method of harvesting belladonna has been developed, resulting in considerable increase in the yield of leaves. An improved method has been developed on bench scale for the production of xanthotoxin from *Ammi majus* seeds at Jammu.

The regional centres at Haldwani and Bangalore produced essential oils, medicinal plants and other crops worth Rs 2.4 lakh.

CIMPO continued to give technical advice to growers of medicinal and aromatic plants throughout the country on the method of cultivation, processing of plants and marketing of the products. As a result of the extension work done by the regional centre at Haldwani, a large number of farmers from Kashipur, Badaun, Moradabad and Rampur have set up their own processing units for Japanese mint oil. Besides, a sizable number of farmers have taken up the cultivation of *Mentha citrata*, *M. piperita* and Palmarosa as a result of the transfer of technology by the Haldwani Regional Centre. The regional centre at Bangalore speeded up extension work in the southern states, with the result that there was a considerable increase in the production of citronella oil and the country produced approximately 400 tonnes of the oil during the year.

For the first time, CIMPO took up general consultancy work, and consultancy services were provided to Kothari Plantations and Industries Ltd, Calcutta.

One of the main achievements of the J & K commercial centre was the record production of 14.5 tonnes of ergot as compared to 7.5 tonnes in the previous year. There was also substantial increase in the production of belladonna and pyrethrum. The commercial unit showed a profit of Rs 18.2 lakh during the year as compared to Rs 8.35 lakh during 1974-75. The unit also saved foreign exchange worth Rs 22 lakh by producing these items, which would have been imported otherwise.

Forty-five papers were published during the year.

PROCESSES AND PRODUCTS READY FOR COMMERCIAL UTILIZATION

Trichlorobenzene

Trichlorobenzene (TCB) is used as a solvent in the chemical manufacturing industry, particularly dyes and intermediates. It can be used as a dielectric fluid, synthetic transformer oil and heat transfer medium. It is also used in the manufacture of tetradifon, as such or after fractionation.

At present, TCB is being manufactured by some parties by further chlorination of crude dichlorobenzene (rich in *o*-dichlorobenzene). However, by this route it is difficult to prepare 1, 2, 4-trichlorobenzene free of dichlorobenzenes and other isomers of TCB.

In the conventional method, chlorination of dichlorobenzene yields trichlorobenzene with some percentage of dichlorobenzene and tetrachlorobenzene. The National Chemical Laboratory (NCL), Poona, has developed a process for the manufacture of TCB which consists in dehydrochlorination of non-gamma BHC in the presence of alkali. Non-gamma BHC is a waste product obtained in the manufacture of Lindane. The process has been standardized on a 100 kg batch scale on pilot plant. The product obtained by the laboratory contains about 88% 1, 2, 4-trichlorobenzene with only about 12% of the 1, 2, 3-isomer. The product can be directly used for the manufacture of tetradifon, for which NCL has already developed a process.

The data on the requirements of TCB are not readily available.

Non-gamma BHC and caustic soda lye (48-60%) are the main raw materials required for the manufacture of trichlorobenzene, and both these are available indigenously.

Jacketed reactor (MS) with stirrer and flush bottom valve, condenser (MS), storage tanks (MS), settler (MS), pumps and boiler are the main items of plant and equipment. These are either available indigenously or can be fabricated locally.

The minimum capacity of an economically viable unit, as assumed by NCL, is 300 tonnes per annum. The capital outlay for a plant of this size has been estimated at Rs 9.87 lakh (Rs 5 lakh on land, building, plant, equipment, etc., and Rs 4.87 lakh as working capital). The ex-factory cost of production comes to Rs 4.85 per kg.

Process know-how for trichlorobenzene has been released for commercialization to Mycol International Agencies, Madras, through the National Research Development Corporation of India.

Further particulars can be had from: The Managing Director, National Research Development Corporation of India, 61 Ring Road, Lajpat Nagar III, New Delhi 110024.

Potassium Nitrate and Ammonium Chloride by Ion Exchange Technique

Potassium nitrate is being prepared in India by extraction of a crude salt petre from soil-efflorescence (known as *Kalmishora*). It is not possible to meet the present growing demand of potassium nitrate by resorting to this age-old method. The ion-exchange process developed at the Central Salt & Marine Chemicals Research Institute (CSMCRI), Bhavnagar, to prepare potassium nitrate using potassium chloride and ammonium nitrate is promising. It consists in converting the strong base anion exchange resin into nitrate form by passing a solution containing a suitable concentration of ammonium nitrate through the column. Potassium chloride solution is then run through the column, and a mixture of potassium nitrate and potassium chloride is obtained. This mixture is easy to fractionate. While regenerating the column with ammonium nitrate, a solution of ammonium chloride and ammonium nitrate is obtained. Ammonium chloride is recovered and ammonium nitrate is recycled.

The process was carried out on a bench pilot plant scale and about 20 kg of potassium nitrate were prepared in two shifts of 12 hr per day. The

product was of commercial grade purity (98-99% potassium nitrate).

Anion exchange resin, potassium chloride and ammonium nitrate are the main raw materials required in the process.

The major items of plant and machineries are : ion exchange column unit, centrifuge, evaporator, tray drier, furnace, pumps and motors. All these are available indigenously.

Potassium nitrate is used in the manufacture of explosives and safety matches. As the present production in India is not able to meet the demand there is a good scope for CSMCRI process.

The total investment for putting up a plant capable of producing 300 tonnes of potassium nitrate and 150 tonnes of ammonium chloride per annum (300 working days with three shifts) is estimated at about Rs 8.45 lakh (comprising Rs 1.20 lakh on land and building, Rs 3.25 lakh on equipment, and Rs 4.00 lakh as working capital).

Further particulars can be had from : The Managing Director, National Research Development Corporation of India, 61 Ring Road, Lajpat Nagar III, New Delhi 110024.

Sensitized Zinc Oxide Coated Paper for Electrophotographic Machines

Electrophotographic machines are used for copying or printing by electro-optical methods in contrast to contact printing or conventional chemical photographic process. The electro-optical method is based on electrostatics and photoconductivity and requires no chemical processing. The most common form of automatic electrophotographic machine uses a sensitized coated paper which is conducting and is coated with an emulsion of photoconductor like zinc oxide, a binder resin and a sensitizer. This paper is charged with the corona charging system of the machine and exposed to the document in the dark. During the exposure, the light falling on the paper dissipates the charge, forming an electrostatic latent image of the document. The electrostatic latent image is developed by immersion in a liquid developer containing oppositely charged toner particles which, when dried in an air blast, gives a dry copy. It takes a few seconds to make a copy of the document.

The annual requirement of sensitized zinc oxide coated paper (A4 size) is estimated roughly at 10 million sheets. Presently this paper is being imported to meet the requirement of making copies with the imported machines available in the country.

The National Physical Laboratory (NPL), New Delhi, has developed a process for making sensitized paper for electrophotographic machines. A paper having good format is made electrically conducting by coating it with a suitable electroconductive coating. The electrically conducting paper is coated with sensitized zinc oxide-resin emulsion having requisite electrophotographic properties and is stored suitably.

Special grade zinc oxide; organic solvents like toluene, xylene and alcohol; sensitizer; electroconductive resin; binder resin and paper are the raw materials required. All these are indigenously available.

The specifications of the product are as follows : the paper is required to attain the acceptance potential of 340 V at a relative humidity of 40-60%. The dark decay rate should be less than 4 V per sec. Exposure of charged paper to 450 to 650 nm light should dissipate the charge in less than a second.

The process has been successfully tried in a commercial plant.

The plant and machinery required are : conventional paper-coating plant capable of coating aqueous and organic solvent based solutions and emulsions, mixing equipment like ball mill or colloid mill, testing and calibration equipment like an electrofax machine, and an electrometer for the measurement of charge.

A plant producing 10 million sheets per annum would require a fixed capital of Rs 9.95 lakh and a working capital of Rs 5.80 lakh. The estimated cost of production is 30 paise per sheet.

Further particulars can be had from : The Managing Director, National Research Development Corporation of India, 61 Ring Road, Lajpat Nagar III, New Delhi 110024.

Device for Testing Mechanical Strength of Glass Shells of Bulbs

The device, developed at the Central Mining Research Station (CMRS), Dhanbad, is designed on the moving nut principle. A cylindrical nut carried by vertical bolt and prevented from rotating in the horizontal plane moves in a vertical direction when the bolt is rotated about its vertical axis. The vertical motion of the nut is transferred to an horizontal mild steel plate by rigid attachments and is utilized for applying the load on the crown of the cap lamp bulb against the pan of a dial spring balance which gives a continuous indication of the magnitude of the load applied during the entire loading period. The mechanical strength of glass shell of the bulb of miner's cap lamp is important to increase the safety margin of cap lamp in gassy mines. In the event of the glass shell breaking in a mine as a result of impact shocks on the cap lamp the hot glowing filament of the electric bulb poses an explosion hazard. According to IS : 2596-1964, the finished bulb should withstand a load of 4.5 kg applied gradually on the crown of the bulb. This device can also be used for testing the mechanical strength of glass shells of other type of miniature bulbs by replacing the detachable bulb holder with a suitable one. The maximum range of the machine is 10 kg.

A good demand is expected, specially from the collieries.

The raw materials required are : mild steel rods and plates, bronze bush bearings, bronze cylindrical nut, bronze

ring, brass bulb holder, dial spring balance of range 0-10 kg with pan on the top, a pair of bevel gears of alloy steel with 16 : 11 teeth ratio, Perspex sheet $154 \times 100 \times 6$ mm^3, three steel bolts and nuts and a sealed type ball bearing. All these are available indigenously.

The device can be manufactured in a small workshop and it is suggested that entrepreneurs who have the workshop facilities should take up production. All the plant and machineries are available indigenously.

The estimated capacity of an economically viable unit is 50 units of the device per annum. Such a unit would require Rs 8000 as working capital and Rs 280 on raw materials. The cost of production per unit is estimated at Rs 480.

Further particulars can be had from: The Managing Director, National Research Development Corporation of India, 61 Ring Road, Lajpat Nagar III, New Delhi 110024.

Flash Distillation Process of Desalination

Desalination technology is of great advantage to the coastal regions of the country. Among the desalination techniques so far developed, distillation processes are most suitable for desalting of oceanic waters.

With a view to developing a desalination process indigenously, investigations were undertaken at the Central Salt & Marine Chemicals Research Institute (CSMCRI), Bhavnagar, some years ago and a flash distillation plant of 100 gallons/hr capacity has been designed and operated successfully. The proccess is based on the principle of distilling out the saline water under reduced pressure to produce fresh water. When a bulk of hot saline water is allowed to enter a chamber or box, the water starts flashing and gives rise to vapours. The vapours so generated are condensed suitably over cold tubes, thus yielding distilled water.

The institute had designed a flash distillation plant of 100 gallons/hr capacity with two stages. The plant has been successfully operated, and based on studies, the design of a 50,000 gallons/day capacity plant has been prepared.

The total investment required for putting up a plant capable of producing 2,50,000 litres of fresh water per day (three shifts) is estimated at Rs 40 lakh. The cost of production of a thousand litres of fresh water works out to Rs 20.

Further particulars can be had from: The Managing Director, National Research Development Corporation of India, 61 Ring Road, Lajpat Nagar III, New Delhi 110024.

PERSONNEL NEWS

Appointments/Promotions

Dr B. M. Gupta

Dr B. M. Gupta of the Central Drug Research Institute (CDRI), Lucknow, has been promoted as Scientist EII with effect from 17 December 1975.

Dr Gupta (born 6 Dec. 1920) graduated from the Allahabad University (1939), and worked as a research assistant in the Mycology Division of the Indian Agricultural Research Institute. Proceeding to USA on a government overseas scholarship (1946), he obtained M.S. degree (1948) from the University of Pittsburgh. He worked under Dr W. C. Price and Dr Jonas Salk on the mechanism of action of antiviral substances from fungi and obtained his Ph. D. degree in 1950. In April 1949, he attended, as a delegate of the Pittsburgh University, the second US National Symposium on Antibiotic Research held in Washington DC. He was lecturer in the faculty of biological sciences for one term (1949-50) in the same university.

Dr Gupta joined CDRI in 1951 and became Senior Scientific Officer in 1957. He was deputed to UK under Colombo Plan in 1959 and worked at Rothamsted Experimental Station, Herpenden, and Herts Tissue Culture Laboratory of the University of Glasgow. Returning to India in 1960, Dr Gupta worked on the development of nontoxic antiviral substances of synthetic and animal origin. In 1967 he was promoted as Scientist EI and was given the charge of the newly developed department of virology at CDRI. Early in 1977 he visited several important virus research centres in USA under the Indo-US Scientists Exchange Programme.

Dr Gupta has made important contributions in the field of virus chemotherapy and methods of assay of interferons. His discovery of T-poly, a broad spectrum antiviral antibiotic of fungal origin, has opened a new approach to virus chemotherapy. At present, he is working on 6-MFA, an interferon inducing antiviral antibiotic derived from the fungus *Aspergillus flavus*, containing dsRNA as the active ingredient, effective against a number of unrelated vertebrate viruses.

He has to his credit more than 80 research papers.

Dr B. K. Saikia

Dr B. K. Saikia of the Regional Research Laboratory (RRL), Jorhat, has been appointed, on promotion, Scientist EI with effect from 31 August 1977.

After obtaining his B. Sc. degree (1954) from the Gauhati University, Dr Saikia joined the Tocklai Experimental Station, Jorhat, as an analyst. In 1957 he left for UK for higher studies and obtained his Ph. D. degree (1960) in soil chemistry from the King's College, University of Durham. After brief services at the King's College and with the Government of Assam in Shillong, Dr Saikia joined RRL, Jorhat, in 1964 as a scientist. He was responsible for organizing the analytical chemistry wing of the laboratory.

In 1967, he was awarded a Unesco fellowship for a year to participate in the Unesco postgraduate course in modern analytical methods of chemical research held in Czechoslovakia. Dr Saikia joined a research group in the Institute of Instrumental Analysis in Brno and worked on adsorption

isotherms of aromatic hydrocarbons on organic porous polymers. He attended the seminar on modern methods in chemistry teaching, sponsored by Unesco in the Charles University, Prague, in March 1968 and also took part in the international seminar on capillary gas chromatography organized by the Czechoslovak Academy of Science in Brno in May 1968.

Dr Saikia has been responsible for developing and modifying both chemical and instrumental methods of analysis of drugs and pharmaceuticals, and for developing the process for manufacturing tartaric acid from tamarind leaves.

Dr Saikia is currently engaged in the application of spectrometric methods and development of analytical techniques for different compounds of the various processes of the laboratory. He has 16 papers and two patents to his credit.

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The following persons have been appointed on promotion at the Regional Research Laboratory (RRL), Jorhat: Shri S. K. Barat (Scientist C; 30 Aug. 1977), Shri C. N. Saikia (Scientist C; 1 Sep. 1977); and Shri D. K. Dutta (Scientist B; 22 Sep. 1977). Dr A. Garg has been appointed as Scientist B in the laboratory (31 Aug. 1977).

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Promotions at RRL, Jorhat, include Shri A. K. Sharma (Scientist A; 24 March 1977); Shri A. K. Shukla (Scientist A; 8 March 1977); and Shri J.N. Borgohain (Scientist B; 16 March 1977).

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Shri V. L. Mashalkar has been appointed Scientist C1 at the National nal Chemical Laboratory, Poona, (27 Oct. 1977).

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Shri Rameshwar Prasad has been appointed Scientist B at the Indian Institute of Petroleum (IIP), Dehra Dun (28 Oct. 1977).

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Promotions at IIP include: Shri T.K. Ghosh (Scientist B, 11 Oct. 1977); and Shri S. K. Bansal (Scientist B1; 20 Jan. 1977).

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Mrs Shanta Satyanarayana and Dr C. K. Kale of the National Environmental Engineering Research Institute, Nagpur, have been promoted as Scientist B (19 Oct. 1977).

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The following persons have been promoted to Scientist A from Senior Scientific Assistant at the Central Fuel Research Institute (CFRI), Dhanbad (with effect from 24 Feb. 1976); Shri P. K. Sarkar; Shri S. B. Banerjee; Shri D. N. Tiwari; Shri P. K. Mazumdar; Shri K. N. Roy; Shri P. C. Talapatra; Shri V. P. Marwaha; Shri T. Banerjee; Shri R. N. Biswas; Shri K. P. Das Choudhury; Shri T. K. Roy; Shri Janardhan Singh; Shri Sunil K. Roy; Shri Israil Ansari; Shri P. K. Sanyal; Shri S. R. Das; Shri A. K. Paul; Shri D. R. Bose; Shri R. K. Jain; Shri A. K. Nag; Shri S. H. Mukherjee; Shri M. C. Chakraborty; Shri L. S. Kulkarni; Mrs Chinmoyee Choudhury; Shri D. K. Sarkar; Shri P. K. Bakshi; Shri B. N. Mandal; Shri K. K. Mitra; Shri A. N. Banerjee; Shri N. C. Basak; Shri D. K. Roy; Shri P. L. Sharma; Shri R. N. Basak; Shri A. K. Chakraborty; Shri M. K. Basu; Shri B. L. Shah; Shri N. D. Wadod; Shri J. N. Saha; Shri S. K. Mandal; Shri S. K. Chakraborty; Mrs Meera Sen; Shri U. Hazarika; Shri S. J. Kanetkar; Shri Y. S. Kaushikar; Shri G. Sundaram; Shri K. S. Rao; Shri D. N. Dhar; and Shri B. B. Sinha.

Others promoted as Scientist A at CFRI include Shri Satyabrata Ghosh (2 March 1976); Shri S. N. Hazarika (2 March 1976); Shri S. S. Choudhury (6 June 1976); and Shri J. K. Deva (10 June 1976).

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Shri V.V. Muralidhara Rao of the Central Leather Research Institute, Madras, has been promoted from Scientist B to Scientist C (16 Aug. 1977).

Obituary

We record with deep regret the sad demise of Dr Masih Prasad, Scientist, National Environmental Engineering Research Institute, Nagpur. Dr Prasad died of a heart attack on 31 October 1977. Dr Prasad had done outstanding work in the field of utilization of effluents from pulp and paper mill plants.

PATENTS FILED

154/Del/77 : A novel process for the synthesis of peptides, B. Devadas & K.B. Mathur—CDRI, Lucknow.

155/Del/77 : A process for the synthesis of 1-β-naphthalene-sulphonyloxybenzotriazole, B. Devadas & K. B. Mathur—CDRI, Lucknow.

161/Del/77 : A process for the manufacture of a bonding agent from substituted resorcinol for bonding rubber to synthetic fabrics, B. Banerjee & G.B. Desale—IRMRA, Thana.

COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

Advertisement No. 1/IHP/77

The USSR National Committee for International Hydrological Programme (IHP) invites applications for the award of scholarships to two Indians for higher studies on 'Scientific Basis of Ground Water Research and Protection' to be conducted by the Moscow State University from 10 June to 10 August 1978. Participants will receive 180 roubles per month plus expenses on field trips and only return journey from Moscow to Delhi. The air fare from India to Moscow will be borne by the participant or his sponsoring authority. Applicant should be M.Sc. in applied geology/geology or graduate in civil engineering or allied fields with 5 years' research/practical experience in groundwater hydrology. Candidates who have not received higher training abroad in a hydrology course within the last 5 years and who are below 45 years age are preferable. Completed applications should be submitted latest by 10 March 1978. For application forms apply with a self-addressed envelope (23 cm × 10 cm) up to 15 February 1978 to : The Secretary, Indian National Committee for IHP, Council of Scientific & Industrial Research, Rafi Marg, New Delhi 110001.

Printed & Published by Y. R. Chadha, Chief Editor, Publications & Information Directorate (CSIR), Hillside Road, New Delhi 110012, at Leipzig Press, D-52, South Extension Part 1, New Delhi 110049
Editorial Staff : P. S. Shankar, D. C. Goswami, S. K. Rastogi & B. C. Kashyap

RN 4212/5